

The Amami Woodcock *Scolopax mira*: its identity and identification

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The Amami Woodcock *Scolopax mira* is a good species, resident on at least four islands in the Nansei Shoto (Japan): Amami-oshima, Tokunoshima, Okinawa and Tokashiki-jima. It is generally less rufous and more olivaceous than Eurasian Woodcock *S. rusticola*, with longer legs, a more gently sloping forehead and flatter crown. The first (supraocular) crown bar is narrower in *mira*, and its two facial bars are parallel, not convergent as in *rusticola*. The folded wing of *mira* lacks a bold pattern and its tail lacks a dark band and paler tip. No aerial display is recorded in *mira*, whose flushing behaviour is generally unlike *rusticola*'s. Habitat protection and hunting prohibition are needed to secure *mira*'s future.

The Amami Woodcock is a little-known bird, long considered endemic to the single island of Amami-oshima, in the Nansei Shoto group of islands, Japan. It was first described as a race of the Eurasian Woodcock *Scolopax rusticola mira* by Hartert (1916), although he admitted that, on the basis of only the type specimen (an adult male taken on Amami-oshima on 10 December 1904 by one of Alan Owston's collectors), he would have described it as a distinct species. He was, however, swayed in his opinion by the appearance of a young bird (the specimen of which we are unable to trace) which closely resembled *S. rusticola* in coloration. His caution was initially followed (e.g. Kuroda 1918, OSJ 1942, Kiyosu 1965), but more recently some authors have considered this bird to be a full species (Kobayashi 1979, WBSJ 1982, Cramp and Simmons 1983), although their judgement has been based on limited evidence (such as tarsus length and egg size) or even on erroneous information, as in Cramp and Simmons (1983) where the decision stemmed from a belief that both *rusticola* and *mira* breed in the northern 'Ryukyu Islands'. Vaurie (1965) alone seemed completely convinced of the separation of the two, and he regarded *mira* as 'too sharply differentiated to be conspecific' with *rusticola*. Short (1972) regarded *mira* as questionably distinct at species level from *rusticola* however, and Prater *et al.* (1977) reasonably, in the absence of up-to-date and adequate information from the field, but in contradiction to Vaurie (1965), maintained the original view that the Amami Woodcock was merely a subspecies of the Eurasian Woodcock.

Until recently it was thought that the Amami Woodcock was extremely difficult to identify in the field because of its close similarity to the Eurasian Woodcock (Takano 1980, WBSJ 1982, Hayman *et al.* 1986). Lengthy observation of both forms in the field, as well as an examination of skins and of photographs of birds from the Japanese main islands and the Nansei Shoto, have led us to the firm conclusion the two are specifically distinct, and that confusion over the identification of *S. rusticola* and *S. mira* need not exist. In this paper we review the available literature concerning *S. mira* and present details from our own observations and others showing that various

characteristics not only facilitate the separation of *S. mira* from *S. rusticola* in the field, but provide strong evidence for their separation as species.

DISTRIBUTION

The Eurasian Woodcock is monotypic with almost no variation throughout its large range, which includes various regions and islands (on some of which, such as the Azores, it is sedentary) that are more isolated from the major part of the species's range than the Nansei Shoto are from mainland Japan (Vaurie 1965). It breeds in temperate northern Japan (commonly on Hokkaido, and uncommonly in northern and central Honshu) and migrates through southern Japan including the subtropical Nansei Shoto with some wintering there, from September to April/May (Vaurie 1965, Short 1972, OSJ 1974, WBSJ 1982). (Nansei Shoto, literally south-west islands [see Figure 1], refers to all those Japanese islands stretching in an arc between Kyushu and Taiwan, and therefore including the Ryukyu Islands which stretch from Okinawa south-westwards; in the past "Ryukyu" has been used somewhat incorrectly to include islands north of Okinawa.) It seems highly unlikely that this wide-ranging species should include a resident island race as its only distinct subspecies. Except for one record of supposed breeding of Eurasian Woodcock on Amami, which in fact may well have been Amami Woodcock (see Hachisuka 1952), the nearest regular breeding grounds are c. 1,000 km north of the Amami Woodcock's range. The Eurasian Woodcock has also been recorded once in summer on Yakushima, an island just south of Kyushu (Ogawa 1905). This island, with a mountain peak higher than any in Kyushu, has vegetation more akin to that in the mountains of central Honshu, and if the Eurasian Woodcock were to breed anywhere in the Nansei Shoto this would be the most likely habitat for it.

Other island endemic woodcock species exist in the Oriental region, and the zoogeographical evidence from the Nansei Shoto indicates that conditions there have been ideal for the evolution of endemic species. Several endemic birds have clear or arguable specific status: the Okinawa Rail *Rallus okinawae*, Pryer's Woodpecker *Sapheopipo noguchii*, Ryukyu Minivet *Pericrocotus tegimae*, Ryukyu Robin *Erithacus komadori*, Lidth's Jay *Garrulus lidthi*, the recently reclassified Amami Thrush *Zoothera amami* (Ishihara 1986), and the extinct Ryukyu Woodpigeon *Columba jowyi* and Miyako Kingfisher *Halcyon miyakoensis*. The island chain also harbours several endemic mammals, reptiles, amphibians and numerous other taxa (Brazil 1985a). The existence of an endemic woodcock species on these islands is therefore highly plausible, given that the birds in question are sedentary, morphologically and (contrary to common belief) visibly distinct, and that migratory Eurasian Woodcock pass through the islands without apparently remaining and mixing. Short (1972) considered that *mira* was definitely related to *rusticola* and not to other species of the genus *Scolopax* and is

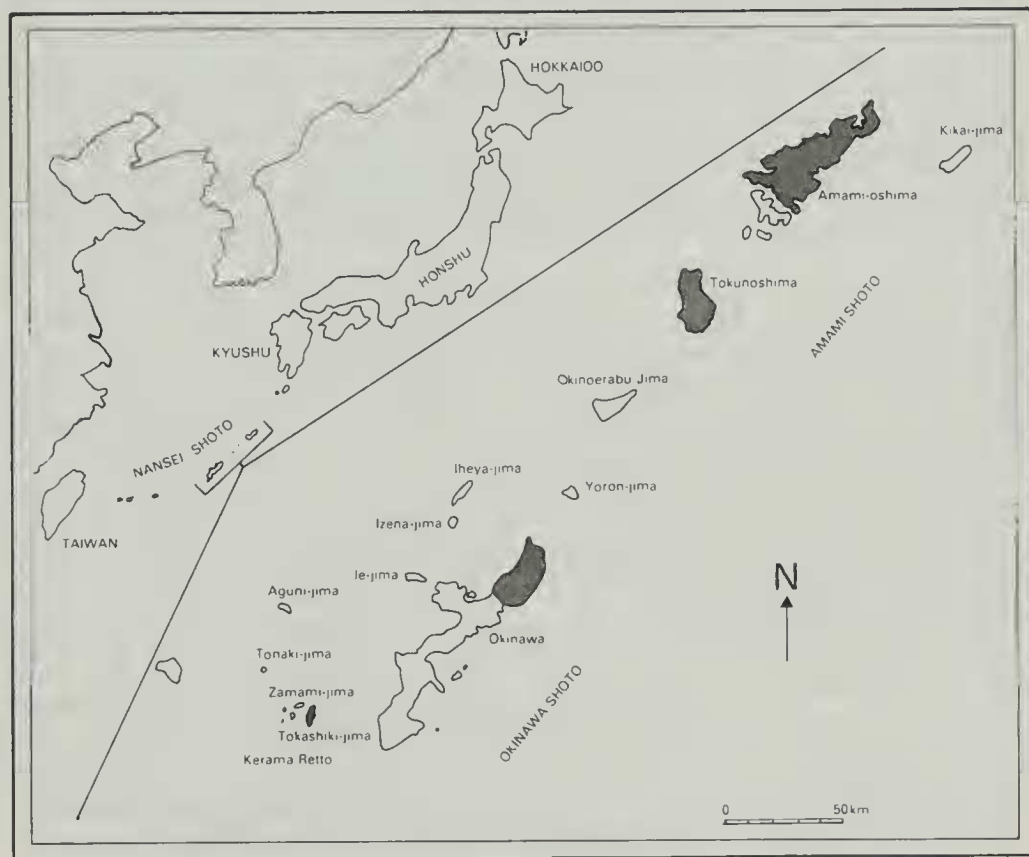
therefore of Palearctic origin.

Until very recently *S. mira* was believed to be a single island endemic occurring only on Amami-oshima, a large (709km²) forested island lying midway between Kyushu and Okinawa (see Figure 1) (OSJ 1974, WBSJ 1982). Kuroda and Hachisuka (in Hachisuka 1952) suspected that it occurred also on Tokunoshima, the next major island south of Amami, and its breeding there has now been confirmed (WBSJ 1978).

On 1 August 1980, during an attempt to catch an unknown species of rail rumoured to exist on Okinawa – this was the as yet undescribed Okinawa Rail (Yamashina and Mano 1981) – an adult Amami Woodcock in active post-breeding moult was caught (K. Ozaki *in litt.*, Yoshii 1985). This record from the northern part of Okinawa, known as Yambaru, was further south again of its known range, and brought the status of the bird into question. Was *S. mira*, like *rusticola*, migratory, moving further south in autumn? (The Ryukyu Robin is now known to migrate within the island chain.) If not, was the Amami Woodcock caught on Okinawa a very unusual stray, or the representative of a previously unsuspected resident population?

As the capacity to identify Amami Woodcock has developed amongst the

Figure 1. The distribution of the Amami Woodcock in Japan.



few resident birdwatchers in the Nansei Shoto, its presence on Amami at all seasons has been confirmed, and more records and photographs of *mira* from Okinawa have come to light. In September 1985 *mira* was also found to occur on Tokashiki-jima in the Kerama Retto, a small group of islands off south-western Okinawa, where the species was photographed by Kenji Takehara; it is presumably resident there. Thus the species is currently known from four islands in the Nansei Shoto (Brazil 1985a, 1986; see Figure 1). It remains to be seen whether it also occurs on islands further south such as Miyako, Ishigaki or Iriomote. The last is particularly well forested and seemingly the most suitable of the southern islands for this bird, except perhaps for the presence there of a nocturnal predator, the threatened endemic Iriomote Cat *Prionailurus iriomotensis*.

DESCRIPTION AND MEASUREMENTS

Hartert (1916, 1917), in his original description of *mira*, noted that it differed from *rusticola* in its 'darker, less rufous, more olivaceous upperside, darker under wing-coverts, less rufescent underside, and larger dimensions, especially a stronger and wider bill. All portions of the upper surface, except the black patches, are more olivaceous and darker . . .' In a later account (Hartert 1922) he noted that the wing was blunter, the wing-tip shorter, and the tarsus and toes longer in *mira* than in *rusticola* and that the black spots of the upperparts were more elongated. Vaurie (1965), no doubt following Hartert (1916, 1917, 1922), noted the very much rounder wing of *mira* when compared with *rusticola*, and also noted a tarsus both longer and thicker, with bigger toes, and a bill which is longer, broader, more flattened and less ridged than in *rusticola*. Takano (1980) also described *mira* as being generally olive-brown, as did WBSJ (1982). However Prater *et al.* (1977) called it 'much redder than most *S. rusticola*, with no grey' and Cramp and Simmons (1983), following Vaurie (1965) closely, differentiated it from the Eurasian Woodcock as follows: 'upperparts more strongly tinged red with larger black spots; tarsus longer and thicker; toes thicker, wing much rounder with longer primary 11; bill longer, broader, more flattened and less ridged.'

The contradiction here over the basic colour comparison is best put down to some degree of variation in the extent of rufous in the plumage of *mira*, combined with western authors being limited to examination of only a very small number of *mira* skins. M.A.B. visited the British Museum of Natural History, Tring, in 1987, when only one specimen was located. The specimen (an adult female, no. 2-225-11 from Alan Owston's collection dated 15 November 1904) is in most respects typical of other specimens of *mira* examined in Japan, except that it is rather more rufous. It is however less grey than specimens of *rusticola* and its overall appearance is generally dark as noted by Hartert (1916, 1917). It may well be that recent descriptions in the west are all based on this specimen, hence the assumption that *mira* is

more rufous than *rusticola*. It was regrettably not possible to refer to the type-specimen, the series of *mira* mentioned by Hartert (1922), or the juvenile that led him to judge it a race not a species, since these were all sold along with the bulk of the Rothschild Collection. The type, an adult male collected on 10 December 1904 and once at the Tring Museum (Hartert 1927), is now in the American Museum of Natural History (OSJ 1942, Greenway 1978), presumably along with the rest of the series.

A comparison of the plumage characteristics of the two species based on a combination of our own field observations, examination of specimens of *S. mira* in Japan and in Britain, of illustrations appearing in the Japan Bird Club (1983) and Kuroda (1984), and of many photographs taken by Kenji Takehara and Mamoru Tsuneda, lead us to conclude that, as Hartert (1916, 1917, 1922), and past Japanese authors have noted, *mira* is on the whole less rufous and more olivaceous in general coloration than *rusticola*.

Hayman *et al.* (1986) noted that the uppertail-coverts of the Amami Woodcock are paler sandy rufous, contrasting more with the back and tail, and that the silvery spots underneath the tail tip are smaller, duller, greyer and less sharply defined than in Eurasian. More readily observed however is that the tail of *rusticola* generally shows a black subterminal band as a result of the uppertail-coverts not fully covering the basically black, grey-tipped tail feathers. In *mira* the tail feathers are dark brown, not black, and are vermiculated with paler brown at the edges and anterior to the grey tips, thus there is no black band. Hayman *et al.* (1986) also noted that the middle secondaries are finely marbled with rufous-brown and whitish-buff, as well as being notched along the feather edges, but that at least some individuals are paler than Eurasian Woodcock with rather uniform sandy or buffish wing coverts. The bill of *mira* is dull horn-brown, the iris dark brown, the legs dull brown, perhaps tinged greyish or dull yellowish, longer than in Eurasian (Hayman *et al.* 1986).

Kiyosu (1965) noted that *rusticola* eggs are the smaller of the two species (Table 3), rounder, buff-brown with spots distributed more at the top, the bottom paler, while *mira* eggs are longer and more oval, the base colour is a pale pinkish-brown and the spots, while concentrated at the top, are also widely scattered at the bottom. Vaurie (1965) referred to eggs of *mira* as being unmistakably different from those of *rusticola*, being darker, larger, and much more spotted on a more reddish ground, and except for considering them darker his description is in agreement with that of Kiyosu (1965). Kiyosu (1965) described the chicks of *mira* as being redder than the adults and more like *S. rusticola*; his description may however have been based on Hartert's young bird. We have been unable to trace the original specimen, nor have any other specimens of young birds come to light. To our knowledge there is none in Japanese collections.

Separation of *mira* from *rusticola* specimens has in the past depended greatly on the major difference in tarsus length. As so few measurements of *mira* are available we include here all those known to us (Tables 1 and 2), even though the method of taking these measurements was not mentioned in

Table 1. Published measurements (in mm) of *Scolopax mira* and *S. rusticola*.

a) <i>mira</i>	Hartert (1916)	Kiyosu (1965)	Kobayashi (1979)	Hayman <i>et al.</i> (1986)
Bill	75-83	75-83	77-82	75-83
Wing	200-215	189-215	190-207	198-215
Tail	—	68.5-82	75-78	67-70
Tarsus	47-49	44-49	42-43	44-49
Middle toe and claw	48-50	46-50	—	—
Primary order	2,3,4,5	—	—	—
Total length	—	—	—	340-360
n	unknown	unknown	unknown	unknown
b) <i>rusticola</i>	Kiyosu (1965)	Kobayashi (1979)	Cramp and Simmons (1983)	
Bill	68-83	67-80	58-92	
Wing	180-219	191-208	182-218	
Tail	75-94	71-82	66-98	
Tarsus	33.4-40	34-38	33.4-40	
Middle toe and claw	—	—	36.2-43.3	
Primary order	2,3,4,5	—	2,3,4,5	
Weight (g)	199-445	—	131-420	
Total length	—	—	330-350	
n	unknown	unknown	1,524	(adults and juveniles combined)

Table 2. Measurements (in mm) of *Scolopax mira* specimens in the Yamashina Institute for Ornithology measured by K. Ozaki.

Rec/Ring no. (Japan)	080-05671	85-267	85-160
Date obtained	Aug 1980	June 1984	July 1985
Island	Okinawa	Amami	Amami
Sex	unknown	male	female
Age	adult	adult	adult
Wing span	—	635	680
Total length	—	330	380
Wing length (natural)	195	202	186
(max)	210	213	212
Tail length	75.5	70	71
Tarsus	47.7	48.7	49.9
Middle toe and claw	—	51.6	55.3
Hind toe and claw	—	14.5	15.2
Bill tip to gape	—	—	76
Bill tip to nostril	64.5	66.1	67
Nostril length	—	—	6
Culmen	80.9	82.1	83.5
Bill tip to rear of skull	—	121	123.8
Bill depth at base	—	—	15.9
Bill tip to overhang	—	—	4
Weight (g)	365	220	390
Ovary	—	—	6.5 × 13.5
			(ova all less than 0.5)

Table 3. Measurements of *S. mira* and *S. rusticola* eggs from Japan.

	<i>mira</i>		<i>rusticola</i>
	Hachisuka (1952)	Kiyosu (1965)	Kiyosu (1965)
Length (mm)	48.2-50.2	47-51.5	40.3-46.8
Width (mm)	36.5-37.8	35-39	31.8-36.8
Clutch	2-4	3-4	—
Weight (g)	—	—	Mean 21.99
n	Not given	Not given	Not given

the relevant publications. Measurements of *rusticola* are given for comparison. Kiyosu (1965), Kobayashi (1979) and Hayman *et al.* (1986) unfortunately only provide ranges for unspecified numbers of specimens, while WBSJ (1982) only gives total lengths of 36 cm for *mira* and 34 cm for *rusticola*. Whether any of these measurements refer to the same specimens is not known. Prater *et al.* (1977) only give two tarsus measurements of 44 and 45 mm and make the general comment that 'the wing and bill lengths are in *S. rusticola* range, but (the) tarsus is much longer and thicker'.

While the measurements in Tables 1 and 2 support Prater *et al.* (1977) in showing the tarsus of *mira* to be longer than that of *rusticola*, this difference might only amount to 2 mm in some instances, although it does appear that on the whole *mira* does have a noticeably longer tarsus. Hartert (1916, 1917) noted that the wings of *mira* are 'much shorter, the distance from the outer secondaries to the end of the primaries being at least 1–2 cm less' than in *S. rusticola*, and similar points were made by Kiyosu (1965) who described the primaries as being more rounded, and closer in length to the secondaries (15 mm difference) than in *S. rusticola* (25 mm difference). Hayman *et al.* (1986) observed that *mira* has much broader wings and a shorter tail than the Eurasian Woodcock, though in fact tail measurements for *mira* fall well within the range of *rusticola*. There seems to be no evidence in support of Cramp and Simmons's (1983) statement that *mira*'s bill is longer than *rusticola*'s, nor are data available to support their statement that *mira* has thicker toes, although the indication from Tables 1 and 2 is that the middle toe is longer in *mira* by at least 2.7 mm.

There is clearly quite a large degree of structural overlap between the two species, with only tarsus and middle toe measurements and overall wing shape clearly separating them. While these points might be observed in the field, identification based on them alone, under field conditions, is not likely to be possible.

FIELD CHARACTERS

Until five years ago, field identification of the Amami Woodcock was considered extremely difficult (Takano 1980, WBSJ 1982). Characters for separating the two species easily in the field were not known, making certain identification for the visiting ornithologist fraught with doubts. Japanese birdwatchers, eager to see the bird, visited Amami between May and August and relied primarily on the fact that only Amami Woodcock bred there: thus any woodcock seen there in summer had to be *mira* (e.g. Takano 1981). The species was, on the whole, considered to be unidentifiable in winter.

We observed Amami Woodcock at night along forest roads in northern Okinawa, from September 1984 to June 1987, and along a forest road in central Amami, an area known as Kinsaku-baru, in July 1985 and June 1987. Birds were all seen after sunset on or near unpaved roads. They were easily

dazzled with a hand-held search-beam and remained in view for several seconds to several minutes, and allowed close views down to 0.5 m. From these observations and from other sources – including examination of skins – we have determined that, given reasonable views, and with care, it is possible to separate them by: (1) the depth of the base of the bill; (2) the angle of the forehead; (3) the shape of the head; (4) the face pattern; (5) the crown pattern; (6) the wing pattern; and (7) voice.

Since it is anticipated that typical views of *S. mira* will be brief, or at least made using weak light, here we concentrate on the main field characteristics separating *mira* from *rusticola*, beginning with the more general characters which should be visible under these conditions, and proceeding to the finer details. In view of the contradictions in plumage descriptions noted above we suggest that much greater attention is paid to the physical characteristics of the birds and to their patterning than to their coloration.

Overall appearance

S. mira generally appears long-legged as a result of the tarsi being up to 1 cm longer than in *rusticola*. Once dazzled it tends to crouch slightly, when its long legs, hunched neck, head and bill shape combine to give it a distinctive outline similar to that of the (smaller) Painted Snipe *Rostratula bengalensis*. Although some *mira* may be slightly larger than *rusticola*, with broader wings and a shorter tail, these features are not consistent (at least based on the measurements currently available), nor are they obvious in the field. The overall colour pattern of *mira* is more uniform, darker olive-brown, and less rufous-brown than *rusticola*, with far fewer contrasting blocks of darker and greyer coloration on the wings and mantle.

Head and bill shape

Shimura (1984) and Sonobe and Taniguchi (1985) refer to the position of the eye as an important field character, but in our opinion this is not immediately obvious in the field. The two species have differently shaped heads, and eye position is in relation to the overall head shape: thus although *mira* has a lower eye than *rusticola*, it is its head shape which stands out as conspicuously different (see Figure 2).

Whereas *rusticola* has a steeply rising forehead and a high-peaked crown, *mira* has a gently sloping forehead forming a shallower angle with the bill (visible at some angles even in flight – D. McWhirter *in litt.*), and a flatter crown (incorrectly illustrated in WBSJ 1982, but described in Brazil 1985b and Hayman *et al.* 1986). The bill of *mira* is deeper at the base and droops more at the tip than that of *rusticola*. Although Hayman *et al.* (1986) describe the bill of *mira* as being tipped darker, in fact it lacks the very prominent dark tip of *rusticola*.

Head pattern

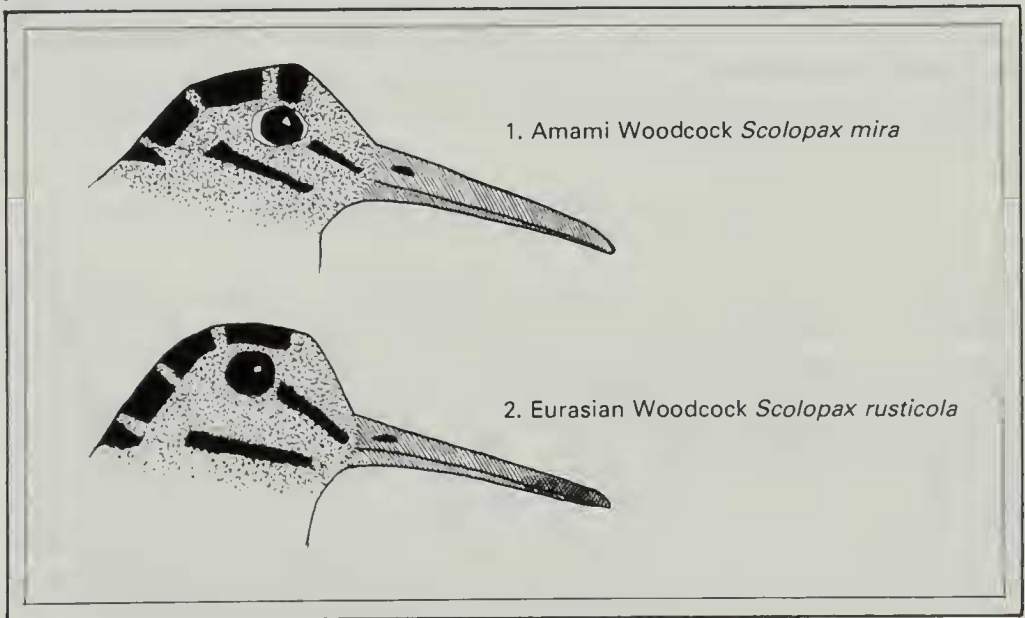
Kobayashi (1979) has suggested that the two species can be separated by the

different coloration of the forehead (brown in *mira* and ashy in *rusticola*); but while this is of value when comparing skins directly, it is in fact virtually impossible to observe in the field. However, as Sonobe and Taniguchi (1985) have indicated, the pattern on the crown immediately above the eyes merits scrutiny. In *rusticola* both the first and the second dark crown bars are equally broad, while in *mira* the first is noticeably narrower than the second. While we agree with Sonobe and Taniguchi (1985) that this character is diagnostic (it is clear on skins and on a certain proportion of photographs), it is not often visible in the field: at some angles the crown bars are not clear and, especially if the bird's plumage is damp, after pushing through wet vegetation for example, their width is difficult to judge. Facial characteristics, on the other hand, are much easier to observe, and are more striking.

Both species have a pale face with two dark bars, one across the lores from the mid-line of the bill to the eye, and one from just below the bill across the cheeks. Since the crown and eye are higher, and the forehead more steeply rising, in *rusticola*, the angle between these two bars is noticeable (see Figure 2). In *mira* the crown and eye are lower, the forehead less steep, and thus these two bars are almost parallel. These facial bars are almost always easily seen, even at angles when the crown pattern is invisible, and are thus a much more useful guide in the field. Moreover, from a comparison of photographs the pale area between the eye and the lower bar is larger in *rusticola*.

Both observations and photographs (see for example Kuroda 1984) show that most *mira* have a bare pink patch around the eye (Brazil 1985b, Hayman *et al.* 1986), which is larger behind the eye than in front, and this can be one

Figure 2. Illustrations of Amami and Eurasian Woodcocks showing head shape, eye position and facial pattern.



of the first things noticed; however, not all birds show it. The significance of this is not yet known, although it is possible that it is an age or sexual character. The same character has also been described from the Obi Woodcock *S. rochussenii*, but not from any other species of woodcock (Hayman *et al.* 1986).

Feather patterning

Head shape and bill depth can be seen even in silhouette, and in reasonable light conditions the facial or even the crown markings are distinctive. Any two of these characters should confirm the identification of *mira*. There are also, however, differences in the specific details of the pattern on the feathers visible on the folded wing. In the unlikely eventuality that the bird is seen on the ground, but with its head obscured, then the pattern on the folded wing should be closely scrutinised. The greater coverts and tertials of *rusticola* carry large ovals of dark brown separated by narrow regions of pale cinnamon-brown, giving a distinctly patterned appearance. Those of *mira* lack this bold pattern; they are instead almost uniformly dark olive-brown with small pale cinnamon-brown triangles visible along the leading edge of the feathers. The primaries of *rusticola* show a similar pattern to those of *mira*, but the cinnamon triangles are much broader-based and longer in the former. This difference alone makes it possible to identify photographs of birds (see for example Kuroda 1984, Okinawa Yacho Kenkyukai 1986) and, while we have not relied on it exclusively in the field, it is a useful extra character. The upper tail of *rusticola* shows a conspicuous dark band and paler tip, whereas in *mira* the dark band is missing. The under-tail of *mira* has smaller, duller and less sharply defined silvery spots at the tip than in *rusticola* (Hayman *et al.* 1986).

The bulk of measurements available for *rusticola* are from western sources such as those included in Cramp and Simmons (1983). Future studies of the morphological differences between these two species would be facilitated by a greater series of measurements of both *rusticola* and *mira* from Japan.

HABITAT, BEHAVIOUR AND VOICE

The Amami Woodcock is a reasonably common resident of subtropical evergreen broadleaf hill forests, with cycads. In Japan the Eurasian Woodcock breeds in temperate, deciduous, broadleaf forests with deep leaf-litter where the dominant ground-cover of dwarf bamboo is not particularly dense, and winters in subtropical, evergreen, broadleaf forests in Kyushu and the Nansei Shoto, and elsewhere to the south of Japan; in Okinawa it also occurs in the 'lowlands' in suburban areas with grass, amongst sugarcane and in copses. The islands of the Nansei Shoto are mountainous, their forested flanks cut with steep-sided valleys and streams. The Amami Woodcock is a bird of the forest floor, preferring damp and shady areas. It is

seldom seen except when it ventures out onto forestry tracks at night. There it probes in the soft earth and short vegetation along the road edges or in the mud of the roadside banks. In winter it is also said to occur among sugarcane fields (WBSJ 1982), but it should be noted that reference to it there pre-dates knowledge of certain field characters for its separation from *rusticola*.

The behaviour of the Eurasian Woodcock is well known and has been reviewed in great detail in Cramp and Simmons (1983); from the little that is known of the Amami Woodcock, there are two obvious points of differentiation from the continental form, namely display and voice. *S. rusticola* is well known for its conspicuous crepuscular aerial display, or roding flights, over forests and forest clearings. Aerial display flights are also noted for the Dusky *S. saturata* and American Woodcock *S. minor*, but not for the Celebes *S. celebensis* or Obi Woodcocks (Hayman *et al.* 1986), although this may be because the last two species are very poorly known.

We have observed *S. rusticola* in Japan most frequently during its roding display flights above the forest canopy, but despite being in the species's forests at the right times of day and year we have never observed, nor found any reference to, any display flights by *S. mira*. Eurasian Woodcocks wintering on, or passing through, Amami-oshima have been reported as giving typical displays and calls there in March and April (K. Kobayashi in Hachisuka 1952). Displays of *mira* observed on Amami-oshima by M. Tsuneda (verbally 1985), a resident birdwatcher on the island, were all quite different from those of *rusticola*; all took place during February and March, on the ground. During these displays between single males and single females the males' wings were held loosely hanging, quivering at their sides, while the head was bobbed gently. The females stood watching nearby and were then mounted. All that is known of the breeding biology of *S. mira* is that it nests on the ground, and lays 2–4 eggs between mid-March and early May (Hachisuka 1952, Kiyosu 1965).

Our observations of Eurasian Woodcocks in Japan suggest that when flushed they usually fly off silently, often directly but sometimes zig-zagging between trees, and drop again after some distance. Amami Woodcocks on the other hand are as likely to run for cover as to fly when disturbed, sometimes call when flushed, and if flushed tend either to drop again very quickly after flying only a short distance or to fly up steeply and land on the branches of trees or amongst vegetation on near-vertical sections of banking. This behaviour may be an adaptation for escaping from ground predators such as snakes, of which there are many within its range.

Since the identification of Amami Woodcock on Okinawa it has been noticed that while some woodcocks remain where first seen or just fly short distances, others flush immediately and fly right off. The popular but unsubstantiated opinion is that the former are Amami Woodcock (those that sit tight are almost invariably Amami), and the latter Eurasian Woodcock.

The Eurasian Woodcock's distinctive call given during roding flight can be transcribed in various ways but basically consists of a soft grunting

followed by a sibilant note, 'ung-ung a-ung, twissick', or even 'chikit chikit boo boo' (WBSJ 1982). No comparable calls have been heard from Amami Woodcocks, which have only been heard to vocalize when flushed, or during displays on the ground. On taking flight they occasionally give a snipe-like 'jeh' or 'jee', while during courtship displays they have been heard to give strong 'gu' calls and softer 'ku' calls (M. Tsuneda verbally 1985), and during distraction displays a continuous shrill 'reep-reep-reep' (Hayman *et al.* 1986).

A NOTE ON CONSERVATION

S. rusticola is generally classified as a game bird in Japan and may be shot (see Environment Agency 1977). Through its treatment as a subspecies of *rusticola*, *mira* comes under the same classification, although on Amami-oshima *rusticola* is given special protection by the Kagoshima Prefectural Government in order to protect *mira*. No special protection is afforded *rusticola* in other islands, such as Tokunoshima or Okinawa, where it remains a game bird, and thus *mira* is not protected there. While four other extant endemic bird species of the region (the Okinawa Rail, Pryer's Woodpecker, Lidth's Jay and Ryukyu Robin) have all been designated as Natural Monuments and therefore cannot be hunted or trapped, *S. mira* has not yet been formally protected in this way. By chance some may occur within the small 'wildlife protection area' for Pryer's Woodpecker on Mt. Yonaha, Okinawa, and birds certainly exist in the extensive northern (U.S. Marine Corps) training area, Okinawa. Since the latter is a restricted area these birds are, to all intents and purposes, protected from hunting, although not necessarily from disturbance of their habitat – a new landing pad for vertical take-off and landing jets, for example, is currently under construction in the area. Deforestation in other parts of Yambaru is now a critical issue (Brazil 1985a). On Amami-oshima, the Kinsaku-baru forest, one of the most important areas within the bird's range on the island, is not protected at all; the importance of this forest and others like it on Okinawa cannot be underestimated.

Given its status as a full species and one which is endemic to the Nansei Shoto, the Amami Woodcock should be made a Natural Monument at the first possible opportunity, in order to prevent hunting (Brazil 1985a). Investigations should be made to estimate its current range and population size, which at the moment is unknown. Observations suggest that it is reasonably common on Amami-oshima and Tokunoshima, while on Okinawa it seems to be uncommon, and in fact it is possibly being hunted there.

We would like to thank Kenji Takehara for his photographic record of the Amami Woodcock on the Tokashiki Islands, and Shinichi Hanawa of the Wild Bird Society of Japan, Kiyooki Ozaki of the Yamashina Institute for Ornithology, and Douglas McWhirter for carefully reading and commenting on the manuscript. M.A.B. would like to thank Yoshitaka Takatsuki for his help and hospitality on Amami-oshima and especially Mamoru

Tsuneda for long and fruitful discussions concerning this bird.

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